ROXY

روكسي

FOR MODERN WATER SYSTEMS
PIPE SYSTEMS

DRAINAGE
PIPING SOLUTION

PP DRAINAGE TECHNICAL CATALOGUE

A MEMBER OF ROXY FOR METAL AND PLASTIC PRODUCTS

DRAINAGE

PIPING SOLUTION

CONTENT

CHAIRMAN MESSAGE

Roxy for metal and plastic products, a member of **Momen Group** holding, was established in 2005 due to the tremendous development in the piping industry to cover the needs of national and international markets.

Our main products include UPVC, HDPE, PP and PPR (pipes & fittings) in all types, colors, and different standards (ASTM, DIN, BS, EN, ISO, IQS, AND EGYPTIAN) depending on the client's needs.

Our head office is in Heliopolis, Cairo, Egypt, and our productions facilities and warehouses are in Obour city, and 10th of Ramadan City production.

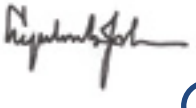
A team of quality assurance specialists in laboratory affairs carry out continuous monitoring processes on the plastic pipes and all the other related parts of the system, such as fittings and related accessories.

We also have a developed quality assurance system that uses a series of advanced devices that allow us to ensure that the production process is up to the international standards and special requirements contracted with our customers.
There is a series of experiments conducted on our plant's production process that include chemical, physical, and mechanical properties.
Adding to that, there is a full range of specialists in the field of plastic pipe installation who are fully equipped to provide our customers with technical advice.

Today **Roxy** is considered as one of the largest market leader companies that produces and processes pipes and its accessories in the Egyptian market as well as the Arab world and Africa.

Our products are accredited in different regions, such as: Egypt, Africa, the Arab world, Europe, and Latin America. Not only are our distribution channels in Africa and the MENA region, but we have also opened new markets in the last two years in north Asia and south America.

CHAIRMAN



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WHY ROXY?

Roxy for Modern water systems

(pipe systems) is an Egyptian company under the umbrella of the holding company **Momen Group,** which has been established in **1989.** One of our several fields of investments is water systems manufacturing.

Our mission
is to establish a circle of trust for every client by providing the best quality, service and price.

We feel proud
to be able to produce Egyptian products with the latest German technologies.

Roxy for metal and plastic products

is producing a full complete solution for Non-Metal Piping systems according to all international and national standards such as:

1. **HDPE** (Drainage, Potable water supply, Irrigation, Fire Fighting, industrial applications, Cable ducting, Marine services, offshore application, oil, and gas applications).

2. **UPVC** (Pressurized and Non-Pressurized systems), (Infrastructure application such as Drainage, Water Supply, irrigation), (Domestic application such as Soil, Wastewater, Vent and Plumbing solutions).

3. **PP-R & PPR-CT** for Potable Water Supply Application.

4. **PP-HT** for non-pressure drainage applications.

5. **PP-MD** for acoustic non-pressure drainage application (under license REHAU Germany).

6. **Gully traps and manholes.**

RoxyPlast is using German technological innovations in its manufacturing process in addition to the usage of the best European and American materials such as Borealis, Boroug, Basell, Shintech and Topilene.

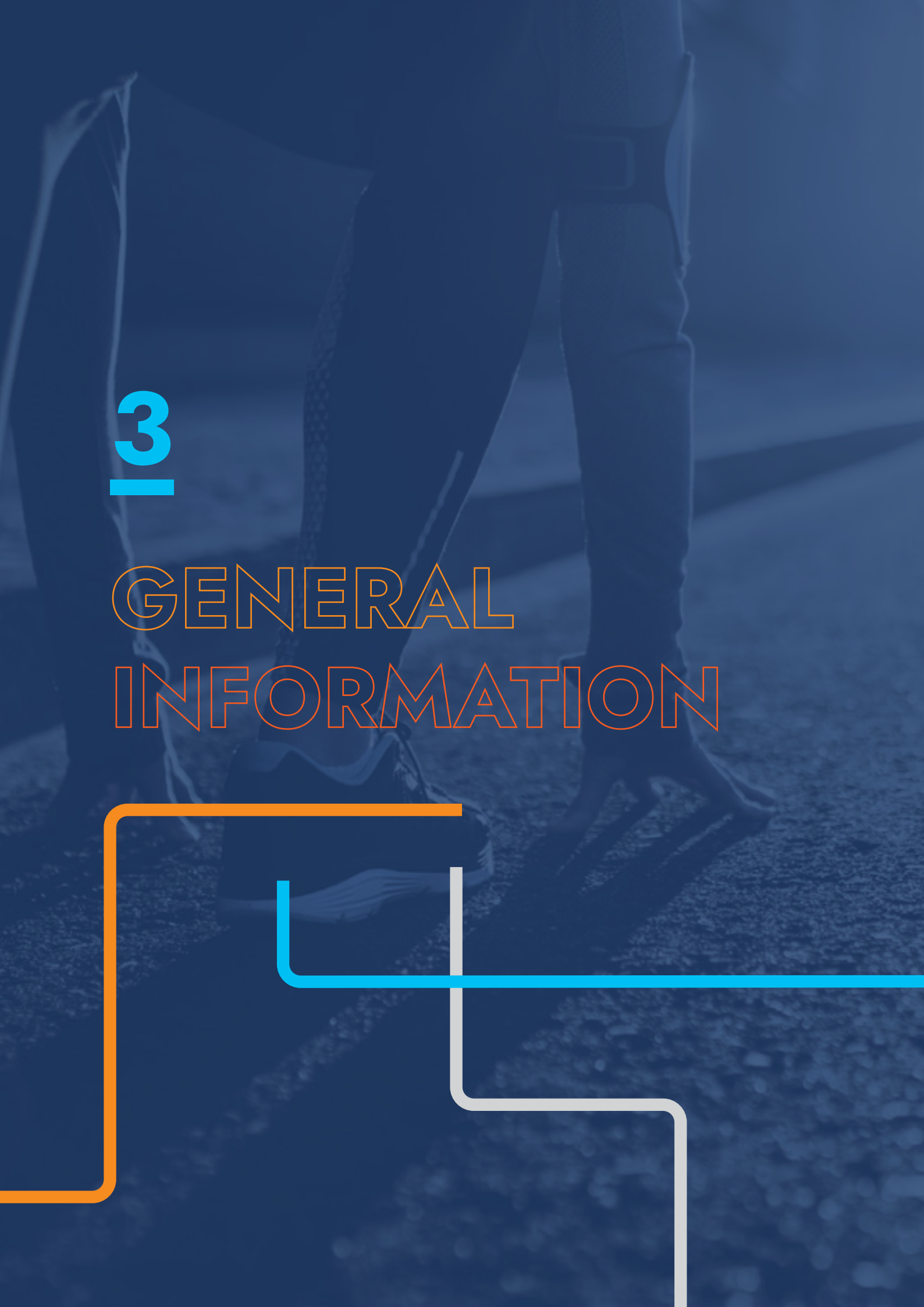
RoxyPlast is following the continuous developments and changes to improve the quality of itsproducts, due to its laboratories designed with the latest equipment.

RoxyPlast gives a warranty on all its systems for up to 50 years.

RoxyPlast has very large quantities of all produced materials that are suitable for any project,whatever its size, due to the availability of large production capacity in its factories. Such massive production capacity enables us to deliver our products in a very short period of time with the best quality and competing prices. We work on a stock basis, not by order production so we can maintain fast delivery.

RoxyPlast has a large business history and deals with both large and small companies, global and local.

RoxyPlast is the only Egyptian company with Egyptian products in the market that has been able to balance between the quality of its products and competitive pricing, which is why we compete with products that are imported from abroad.



3 GENERAL INFORMATION

> Pipes and Fittings are **ECONOMICALLY** compared to other kinds of pipes.

- **ROXYPLAST PP** Pipes and Fittings are made of Polypropylene that guarantees lightweight, high resistance to chemical agents, excellent resistance to abrasion.

- **ROXYPLAST PP** Pipes and Fittings' characteristics are suitable for the construction of waste and drainage systems inside the buildings and other underground systems outside the buildings in accordance with **BS EN1451 for A/G & U/G and BS EN1852 & EN14758 for U/G** and they have a very good resistance to fire with **DIN 4102 B1.**

- **ROXYPLAST PP** Pipes and fittings can be used for waste systems at low and high temperatures, ventilation systems for waste networks and for rainwater drainage systems inside buildings for civil and industrial use, hospitals and hotels.

- **ROXYPLAST PP** Pipes and Fittings are economically compared to other kinds of pipes.

- **ROXYPLAST PP** Pipes and Fittings have a wide range of fittings for connection to other waste systems like cast iron, PVC and PE.

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FEATURES & ADVANTAGES

“CORROSION RESISTANCE.”

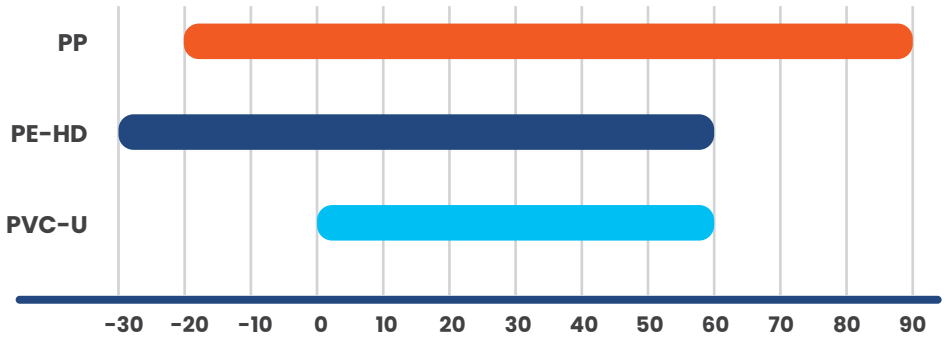
- Easy and Quick to Install and no need to use tools (No bonding).
- Excellent Mechanical, Chemical and Acoustic Properties.
- Corrosion Resistance.
- Low Noise.
- Flexibility of Molecular Structure.
- Long life.
- High Temperature Resistance up to 95° c.
- Smooth internal Surface.
- Light Weight.
- Very Good Resistance to fire with DIN 4102 B1.

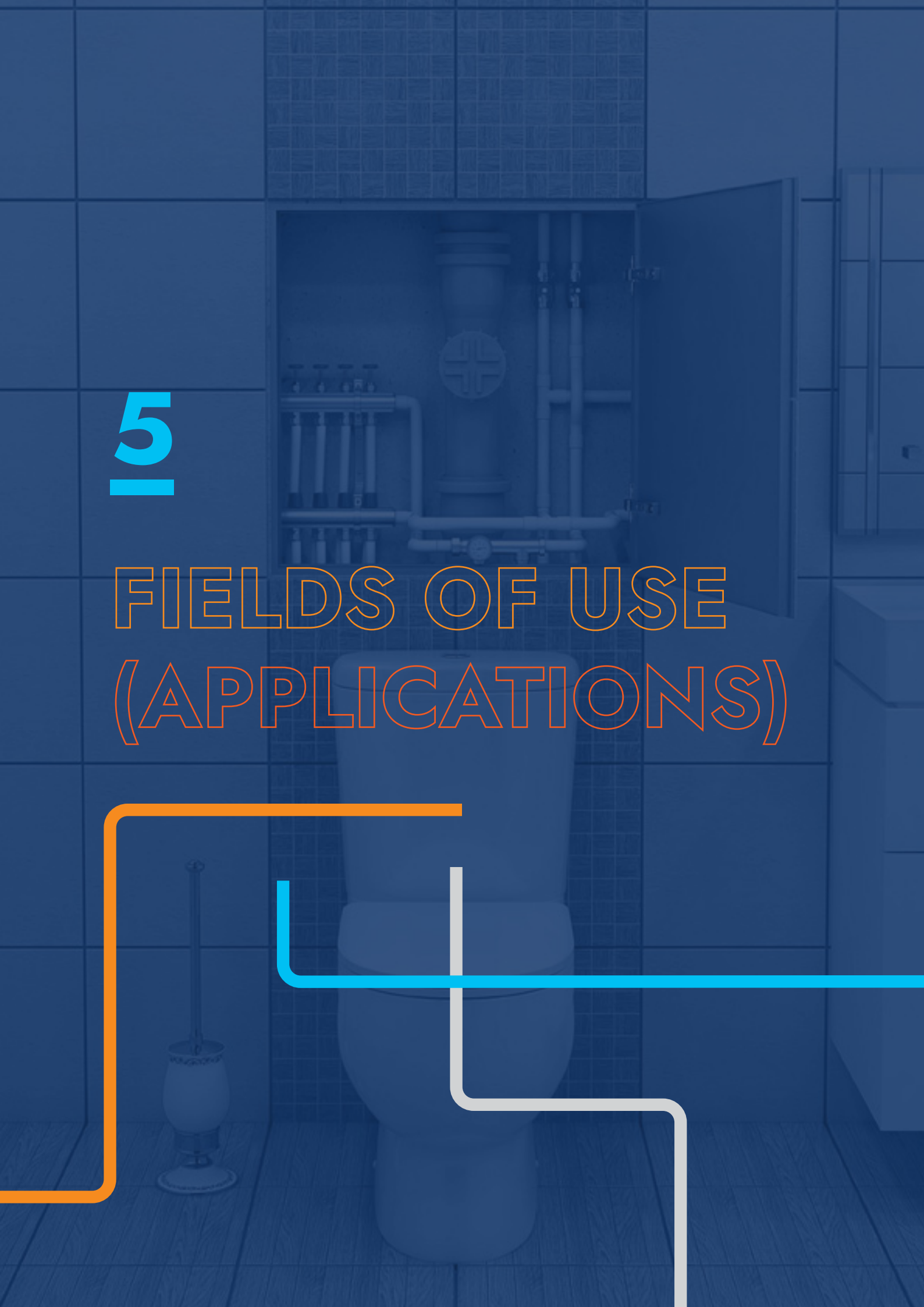
For this below comparison, **ROXYPLAST** strongly recommends use PP system instead of using the traditional system such as UPVC

Comparison Between **(UPVC and PP)** for Aboveground & Underground Drainage Solutions

TYPES	UPVC	PP
1	Hard / Brittle	Flexible
2	Dissolved by some solvents like Acetone and Methyl Ethyl Ketone (MEK)	completely immune to be attacked by any solvents
3	PVC burns fairly easily and creates toxic Hydrogen Chloride in its smoke	PP burns only with great difficulty and makes less harmful carbon and toxic smoke
4	Small Temperature Range: 0° C to +60° C	Big Temperature Range: 0° C to +95° C
5	PVC Makes high noise	PP makes little noise
6	(Low Impact Resistance) Low Stroke Resistance	(High Impact Resistance) High Stroke Resistance
7	Low Resistance to Sunlight	Very High Resistance to Sunlight
8	PVC Pipes have rough surface compared to PP Pipes due to the molecular composition of the material	PP pipes are very smooth and have the lowest friction factor of all sewer pipe materials
9	PVC Pipe's weight is heavy compared to PP Pipe	PP Pipe's weight is light compared to PVC Pipe

Temperature Ranges of Usage





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FIELDS OF USE (APPLICATIONS)

> **BALANCE** between the quality of its proucts and competitive pricing

ABOVEGROUND AND UNDERGROUND INSIDE THE BUILDING:

- Waste Water System.
- Rainwater System.
- Ventilation System.
- Sanitary Fixtures Drainage.
- Washing Machine and Dishwasher Drainage.
- Aggressive Fluid Drainage.
- Prolonged Waste Water Drainage.
- Commercial Kitchens.

UNDERGROUND DRAINAGE SYSTEMS:

- All Underground applications specially drain systems between the building and the main pipe line.
- All Water and Sewage gravity discharging.
- Under SOG (Slab on grade)

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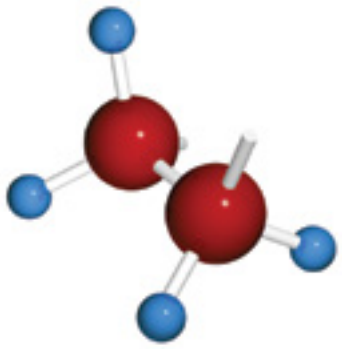
MATERIAL CHARACTERISTICS

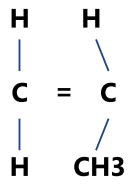
(Polypropylene)

ABOUT THE MATERIAL

Also known as Polypropylene, is a thermoplastic polymer used in a wide variety of applications.

It is produced via chain-growth polymerization from the monomer propylene.





Polypropylene is a thermoplastic material from the polyolefin group. These plastics have been used successfully to make pipes that lasts for decades.
Polypropylene is also used in the automotive industry and in tank systems to meet high safety standards. Its hygienic standard, corrosion resistance, easy manufacturing properties and many other aspects offer excellent quality for a wide range of applications.

Its properties are similar to **polyethylene, but it is slightly harder and more heat resistant,** mechanically rugged material and has a high chemical resistance.

With respect to DIN EN 476, **polypropylene has excellent thermal properties.** It can also be used under extreme conditions.

ADVANTAGES

- High chemical resistance; pH 2–pH 12 (acidic-alkali) stable against biogenic sulphuric acid corrosion.
- High abrasion resistance of polypropylene, which ensures durability and operational reliability.
- Excellent impact resistance and durability.
- Does not tend to crack or spread cracks.
- Robust under mechanical stress (e. g. high-pressure flushing).
- Smooth surfaces, optimum hydraulics.
- No incrustation, deposits cannot build up.
- Self-cleaning, requires less maintenance.

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RAW MATERIAL DATA SHEETS

22.05.2014 Ed.1

Polypropylene
BorECO™ BC212IM

Description
BorECO BC212IM is a polypropylene block copolymer combining high stiffness and good flowability.

Its excellent stabilisation package provides improved thermal stability compared with standard injection moulding grades.

Applications
BorECO BC212IM is intended for: injection moulding, especially in the field of sewage and underground drainage systems.

Physical Properties

Property	Typical Value Data should not be used for specification work	Test Method
Melt Flow Rate (230 °C/2,16 kg)	4,5 g/10min	ISO 1133
Tensile Modulus (1 mm/min)	1.700 MPa	ISO 527-2
Tensile Strain at Yield (50 mm/min)	4 %	ISO 527-2
Tensile Stress at Yield (50 mm/min)	32 MPa	ISO 527-2
Oxidation Induction Time (210 °C),	> 20 min	ISO 11357-6
Charpy Impact Strength, notched (23 °C)	8 kJ/m²	ISO 179/1eA
Charpy Impact Strength, notched (-20 °C)	3,5 kJ/m²	ISO 179/1eA

Processing Techniques
This product is easy to process with standard injection moulding machines.

Following parameters should be used as guidelines:

Melt temperature	230 - 260 °C
Holding pressure	200 - 500 bar
Mould temperature	10 - 30 °C
Injection speed	As high as possible.

Storage
BorECO BC212IM should be stored in dry conditions at temperatures below 50°C and protected from UV-light. Improper storage can initiate degradation, which results in odour generation and colour changes and can have negative effects on the physical properties of this product.

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Polypropylene

BorECO BC212IM

Safety
The product is not classified as dangerous.

Recycling
The product is suitable for recycling using modern methods of shredding and cleaning. In-house production waste should be kept clean to facilitate direct recycling.

Please see our "Safety data sheet" / "Product safety information sheet" for details on various aspects of safety, recovery and disposal of the product. For more information, contact your Borealis representative.

Related Documents
The following related documents are available on request, and represent various aspects on the usability, safety, recovery and disposal of the product.

Recovery and disposal of polyolefins
Information on emissions from processing and fires
"Safety data sheet" / "Product safety information sheet"

Disclaimer

The product(s) mentioned herein are not intended to be used for medical, pharmaceutical or healthcare applications and we do not support their use for such applications.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication; however we do not assume any liability whatsoever for the accuracy and completeness of such information.

Borealis makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

No liability can be accepted in respect of the use of any Borealis product in conjunction with any other products and/or materials. The information contained herein relates exclusively to our products when not used in conjunction with any other material unless as specifically provided for in the test methods stated above.

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BOREALIS

Polypropylene BorECO BA212E

Product Data Sheet

Polypropylene
BorECO™ BA212E

Polypropylene Block Copolymer for Non-Pressure Pipes

DESCRIPTION

BorECO BA212E is a high molecular weight, low melt flow rate polypropylene block copolymer (PP-B) with very high stiffness (PP-B HM) and impact strength.

APPLICATIONS

BorECO BA212E is recommended for solid wall and structured wall non-pressure pipes (including spiral wound pipes and twin wall corrugated pipes), fittings and chambers and profiles.

PHYSICAL PROPERTIES

Property	Typical Value	Test Method
Density	900 kg/m3	ISO 1183
Melt Flow Rate (230 °C/2.16 kg)	0,3 g/10min	ISO 1133
Flexural Modulus (2 mm/min)	1.700 MPa	ISO 178
Tensile Strain at Yield (50 mm/min)	8 %	ISO 527-2
Tensile Stress at Yield (50 mm/min)	31 MPa	ISO 527-2
Charpy Impact Strength, notched (23 °C)	50 kJ/m²	ISO 179/1eA
Charpy Impact Strength, notched (-20 °C)	5 kJ/m²	ISO 179/1eA

** Data should not be used for specification work*

PROCESSING TECHNIQUES

The actual conditions will depend on the type of the equipment used and the diameter and wall thickness of the pipes produced.

Following parameters should be used as guidelines for **extrusion**:

Cylinder	200 - 220 °C
Head	210 - 220 °C
Die	210 - 220 °C
Melt temperature	210 - 230 °C

Specific recommendations for processing conditions can be determined only when the application and type of equipment are known. Please contact your local Borouge representative for such particulars.

STORAGE

BorECO BA212E should be stored in dry conditions at temperature bellow 50 °C and protected from UV-light. Improper storage can initiate degradation, which results in odour generation and colour changes and can have negative effects on physical properties of this product.
More information on storage can be found in Safety Information Sheet (SIS) for this product.

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Polypropylene BorECO BA212E

SAFETY
The product is not classified as a hazardous preparation.

Please see our Safety Information Sheet (SIS) for details on various aspects of safety, recovery and disposal of the product, for more information contact your Borouge representative.

RECYCLING
The product is suitable for recycling using modern methods of shredding and cleaning. In-house production waste should be kept clean to facilitate direct recycling.

RELATED DOCUMENTS
The following related documents are available on request, and represent various aspects on the usability, safety, recovery and disposal of the product.

Safety Information Sheet
Statement on chemicals, regulations and standards
Statement on compliance to regulations for drinking water pipes

DISCLAIMER

The product(s) mentioned herein are not intended to be used for medical, pharmaceutical or healthcare applications and we do not support their use for such applications.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication, however we do not assume any liability whatsoever for the accuracy and completeness of such information.

Borouge makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

No liability can be accepted in respect of the use of Borouge products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third party materials.

March- 2012

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Borouge is part of the ADNOC and Borealis group of companies

Borouge
SHAPING the FUTURE with PLASTICS

TECHNICAL DATA SHEET

Topilene® HB242P

PP-HM Polypropylene Block Copolymer
For PP-B Pipes and Fittings(Non-Pressure Pipes)

Product Description

Topilene® **HB242P** is a specially designed polypropylene block copolymer (PP-B, natural colored) that features high modulus(PP-HM) and excellent long-term hydrostatic pressure resistance. It is suitable for underground drainage & sewage pipes and fittings. It is the outcome of HYOSUNG's integrated polymerization and crystallization technology with advanced PP manufacturing process technique.

Characteristics

Typical Application Drainage & sewage pipes and fittings (Solid wall & twin wall corrugated pipes system) / Industrial pipes

Features Excellent long-term hydrostatic pressure resistance / Excellent stiffness and impact strength balance / Enhanced big diameter pipe manufacturing processability / Chemical stability / Environment-friendly

Compliance The pipes produced with *Topilene*® **HB242P** complies with the hydrostatic pressure requirements according to ISO/DIS 15874. It complies with the requirements of FDA 21 CFR 177.1520.

Typical Properties

Resin Properties	Method	Value	Unit
Melt Index(230℃, 2.16kg)	ASTM D1238	**0.30**	g/10min
Density	ASTM D792	**0.90**	g/㎤
Tensile Strength at Yield	ASTM D638	**320**	kg/㎠
Flexural Modulus	ASTM D790	**18,000**	kg/㎠
Notched Izod Impact Strength(23℃ / -10℃)	ASTM D256	**N.B / 5.0**	kg·cm/cm
Rockwell Hardness	ASTM D785	**85**	R-Scale
Heat Deflection Temperature	ASTM D648	**134**	℃
Vicat Softening Point	ASTM D1525	**157**	℃

The values listed above are typical values for reference purpose only and shall not be construed as specifications.

Storage and Handling

This product should be stored in dry condition at temperature below 40℃ and protected from UV-light. When condensation is visible or can be expected, pre-drying is recommended. (Drying condition: 80~100℃/2~4hours at air circulated condition)

Contacts

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www.topilene.com

HYOSUNG CHEMICAL

TECHNICAL DATA SHEET

Topilene® HB242P

PP-HM Polypropylene Block Copolymer
For PP-B Pipes and Fittings(Non-Pressure Pipes)

Process Guidelines

The actual extrusion conditions will depend on the type of equipment and the SDR of pipes produced. The below conditions may be used as guidelines for this material.

Cylinder feeding zone	170-190℃
Cylinder melting zone	190-225℃
Cylinder mixing zone	200-235℃
Head	200-235℃
Die	200-235℃
Melt temperature	200-235℃
Cooling temperature	20-30℃

Disclaimer

Contacts

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HYOSUNG CHEMICAL

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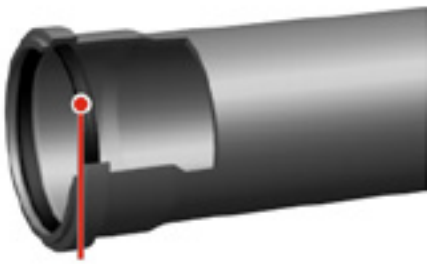
PRODUCT GENERAL PROPERTIES

1 TECHNICAL PROPERTIES



Sizes	Diameters from 32mm up to 160mm.
Pipe Length	From 1 MTR. Up to 3 MTR. (Any length requested by client).
Connection Type	Push Fit System.
Color	Light Grey.
Standard	For A/G & U/G BS EN1451 & DIN4102, and for U/G EN1852 & EN14758
Professional Seal System (Rubber gasket)	From MOL (German Origin).

Rubber Sealing product description:

The SYSTEM BL lip seal ring is developed for plastic pipes and fittings made of PP and PVC in compliance with EN 1451-1 and EN 1401-1 and meets the requirements of EN 681-1 WC.

The socket dimensions recommended by M.O.L. apply as well as for other pipe systems.

The SYSTEM BL seal is mainly used for sewage pipes but is also suitable for use in building systems (high-temperature resistance drainage pipes).

Special dimensions, also for non-standardized applications, are available upon request.

THE ADVANTAGES

- Outstanding long-term elasticity of the rubber seal ensures a durable sealing effect.
- Latest technologies guarantees an optimum cost-benefit ratio.
- The seal can be fitted both by hand and with automatic ring inserters.
- A long-term experience and monitored quality systems (including DIN ISO 9001:2008) guarantee the highest possible safety and reliability.
- Good connecting properties.
- External monitoring by the MPA-NRW/KIWA KOMO.

2 CHEMICAL CHARACTERISTICS

Selected chemical

resistance classification data for PP according to ISO/TR 10358

CONCENTRATION AND/OR PURITY OF THE FLUID	**Dil Sol.**	Dilute aqueous solution at a equal to or less than 10%
	Sol.	Aqueous solution at a concentration higher than 10% but not saturated
	Sat Sol.	Saturated aqueous solution, prepared at 20°C
	tg	At least technical grade purity
	tg-s	Technical grade, solid
	tg-l	Technical grade, liquid
	tg-g	Technical grade, gas
	Work Sol.	Working solution of the concentration usually used in the industry concerned.
	Susp.	Suspension of solid in a saturated solution at 20°C
CHEMICAL RESISTANCE	**S**	Satisfactory resistance
		The pipes can be used for applications in which they are not subjected to pressure or other stresses; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
	L	Limited resistance
		The pipes can be used for applications in which they are not subjected to pressure or other stresses, but in which a certain amount of corrosion can be accepted; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
	NS	Resistance not satisfactory
		The pipes are seriously attacked: they shall not be used for either pressure or non-pressure applications. There is no point in conducting tests under pressure as the pipes would be certain to fail these tests.

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
5	**ACETONE**	-95	56	5	100	-
		-	-	10	50	-
		-95	56	tg-l	20	S
		-	-	tg-l	50	-
		-	-	tg-l	60	S
11	**AIR**	-	-	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	S
		-	-	tg-g	100	S
16	ALUMINUM **CHLORIDE**	250	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
17	ALUMINUM **FLUORIDE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	-
18	ALUMINUM **HYDROXIDE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	-
19	ALUMINUM **NITRATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
20	ALUMINUM **OXYCHLORIDE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
21	ALUMINUM **POTASSIUM SULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
22	ALUMINUM **SULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
23	AMMONIA, **AQUEOUS**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
24	AMMONIA, **ACETONE**	-78	-34	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	-
25	AMMONIA, **LIQUID**	-78	-34	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	-
26	AMMONIUM, **ACETATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
28	AMMONIUM **CARBONATE (DEC. AT 58°C)**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
		-	-	Sat Sol.	120	-
29	AMMONIUM **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
34	AMMONIUM **NITRATE**	170	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
36	AMMONIUM **PHOSPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	-
		-	-	Sat Sol.	120	-
37	ALUMINUM **SULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
41	AMYL **ALCOHOL**	-79	137	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	S
		-	-	tg-1	100	S
43	**ANILINE**	-6	184	Sat Sol.	20	-
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	-
		-	-	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	S
47	APPLE **JUICE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
50	BARIUM **BROMIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
51	BARIUM **CARBONATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	S
52	BARIUM **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	120	S
53	BARIUM **HYDROXIDE**	78	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
54	BARIUM **SULPHATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	S
55	BARIUM **SULPHIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
		-	-	Sat Sol.	120	-
58	**BENZENE**	6	80	tg-1	20	L
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
59	BENZONI **ACID**	122	250	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	tg-s	120	-
61	BENZOYL **ALCOHOL**	-15	205	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	L
62	BENZYL **CHLORIDE**	-39	179	tg-1	20	-
		-	-	tg-1	50	-
		-	-	tg-1	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
65	BORIC **ACID**	-	-	Dil Sol.	20	S
		-	-	Dil Sol.	50	-
		-	-	Dil Sol.	60	-
		-	-	Dil Sol.	100	-
		-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	-
		-	-	Sat Sol.	100	-
66	BORON **TRIFLUORIDE**	-129	-101	Sat Sol.	20	S
		-	-	Sat Sol.	60	-
68	BROMINE **GAS**	-7	58	tg-g	20	NS
		-	-	tg-g	50	-
		-	-	tg-g	60	NS
		-	-	tg-g	100	NS
69	BROMINE **LIQUID**	-7	58	tg-1	20	NS
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
73	BUTANE **GAS**	-135	0.5	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	-
74	**N-BUTANOL**	-80	117	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	L
		-	-	tg-1	80	-
		-	-	tg-1	100	-
83	CALCIUM **CARBONATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	S
84	CALCIUM **CHLORATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	120	-
85	CALCIUM **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	S
88	CALCIUM **NITRATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	50	100	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
101	CHLORINE **DRY GAS**	-	-	tg-g	20	NS
		-	-	tg-g	50	-
		-	-	tg-g	60	NS
		-	-	tg-g	100	NS
102	CHLORINE **WATER**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	L
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
103	CHLORINE **WET GAS**	-	-	tg-g	20	-
		-	-	tg-g	50	-
		-	-	tg-g	60	-
		-	-	tg-g	80	-
105	**CHLOROBENZENE**	-45	132	tg-1	20	-
		-	-	tg-1	50	-
		-	-	tg-1	60	-
		-	-	tg-1	80	-
				tg-1	100	-
107	**CHLOROFORM**	-64	62	tg-1	20	L
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
110	CHLOROSULPHONIC **ACID**	68	147	50	20	-
		-	in	50	20	NS
		-	vac.	tg-s	50	-
		-	-	tg-s	60	NS
		-	-	tg-s	100	NS
141	DIESEL **FUEL**	-	-	Work Sol.	20	-
		-	-	Work Sol.	50	-
		-	-	Work Sol.	100	-
155	BUTANE **GAS**	-114	78	40	20	-
		-	-	40	50	-
		-	-	40	60	-
		-	-	95	20	S
		-	-	95	50	-
		-	-	95	60	S
		-	-	tg-1	20	-
		-	-	tg-1	50	-
		-	-	tg-1	60	-
		-	-	tg-1	100	-
176	**ETHANOL**	-92	-19	Dil Sol.	20	-
		-	-	Dil Sol.	60	-
		-	-	Dil Sol.	80	-
		-	-	30 to 40	20	S
		-	-	30 to 40	50	-
		-	-	30 to 40	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
185	GASOLINE **(FUEL)**	-	-	Work Sol.	20	NS
		-	-	Work Sol.	50	-
		-	-	Work Sol.	60	NS
		-	-	Work Sol.	100	NS
186	**GELATINE**	-	-	Sol.	20	S
		-	-	Sol.	50	-
		-	-	Sol.	60	S
187	**GINGER ALE**	-	-	Work Sol.	20	-
188	GLUCOSE **(DEC. AT >200 °C)**	146	-	Sol.	20	S
		-	-	Sol.	50	-
		-	-	Sol.	60	S
		-	-	Sol.	100	S
		-	-	Sol.	120	-
189	**GLYCERINE**	20	290	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	S
		-	-	tg-1	100	S
		-	-	tg-1	120	-
190	GLYCOLIC **ACID**	80	-	Sol.	20	-
		-	-	Sol.	60	-
		-	-	Sol.	100	-
		-	-	30	20	S
		-	-	30	60	-
		-	-	65	100	-
192	**HEPTANE**	-90	98	tg-1	20	L
		-	-	tg-1	60	NS
		-	-	tg-1	80	-
		-	-	tg-1	100	NS
194	**HEXANE**	-94	69	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	L
		-	-	tg-1	80	-
195	**1- HEXANOL**	-52	158	tg-1	20	-
		-	-	tg-1	60	-
196	**HONEY**	-	-	Work Sol.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
199	HYDROCHLORIC **ACID**	-112	-85	Up to 10	20	S
		-	-	Up to 10	50	-
		-	-	Up to 10	60	S
		-	-	Up to 10	80	-
		-	-	Up to 10	100	S
		-	-	20	20	S
		-	-	20	50	-
		-	-	20	60	S
		-	-	20	80	-
		-	-	20	100	S
		-	-	10 to 20	20	S
		-	-	10 to 20	50	-
		-	-	10 to 20	60	S
		-	-	10 to 20	80	-
		-	-	10 to 20	100	S
		-	-	Up to 25	20	S
		-	-	Up to 25	60	-
		-	-	Up to 25	80	-
		-	-	Up to 25	100	-
		-	-	30	20	S
		-	-	30	60	L
		-	-	30	100	L
		-	-	>30	20	S
		-	-	>30	60	-
		-	-	>30	80	-
		-	-	>30	100	-
		-	-	36	20	S
		-	-	36	50	-
		-	-	36	60	-
		-	-	36	80	-
		-	-	38	100	-
		-112	-85	Conc.	20	S
		-	-	Conc.	50	-
		-	-	Conc.	60	-
		-	-	Conc.	80	-
200	HYDROCHLORIC **ACID, DRY GAS**	-	-	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	S
201	HYDROCHLORIC **ACID, WET GAS**	-	-	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	S
204	HYDROFLUORIC **ACID, GAS**	-	-	tg-g	20	-
		-	-	tg-g	40	-
		-	-	tg-g	60	-
205	**HYDROGEN**	-	-	tg-g	20	S
		-	-	tg-g	60	-
		-	-	tg-g	120	-
213	IODINE, **IN ALCOHOL**	114	183	Work Sol.	20	S
		-	-	Work Sol.	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
216	**ISOOCTANE**	-	99	tg-1	20	L
		-	-	-	60	NS
		-	-	-	100	NS
220	**KEROSENE**	-	150	Work Sol.	20	-
		-	to 250	Work Sol.	100	-
		-	-	-	-	-
239	MERCUROUS **NITRATE**	-	-	Sol.	20	S
		-	-	Sol.	50	-
		-	-	Sol.	60	S
		-	-	Sol.	100	-
		-	-	Sat Sol.	20	S
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
240	**MERCURY**	-	-	tg-1	20	S
		-	-	-	60	S
		-	-	-	120	-
244	METHYL **ACETATE**	-98	57	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	S
245	METHYL **ALCOHOL**	-97	65	5	20	S
		-	-	5	50	-
		-	-	5	60	L
		-	-	5	100	L
		-97	65	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	-
		-	-	tg-1	80	-
254	**MILK**	-	-	Work Sol.	20	S
		-	-	Work Sol.	50	
		-	-	Work Sol.	60	S
		-	-	Work Sol.	100	S
260	NICKEL **ACETATE**	-	-	Sat Sol.	20	-
		-	-	Sat Sol.	40	-
		-	-	Sat Sol.	60	-
261	NICKEL **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
262	NICKEL **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	120	-
263	NICKEL **SULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
50	BARIUM **BROMIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
51	BARIUM **CARBONATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	S
52	BARIUM **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	120	S
53	BARIUM **HYDROXIDE**	78	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
54	BARIUM **SULPHATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	S
55	BARIUM **SULPHIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
		-	-	Sat Sol.	120	-
58	**BENZENE**	6	80	tg-1	20	L
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
59	BENZONI **ACID**	122	250	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	tg-s	120	-
61	BENZOYL **ALCOHOL**	-15	205	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	L
62	BENZYL **CHLORIDE**	-39	179	tg-1	20	-
		-	-	tg-1	50	-
		-	-	tg-1	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
265	NITRIC **ACID**	-	-	5	20	S
		-	-	5	50	-
		-	-	5	60	-
		-	-	5	80	-
		-	-	10	20	S
		-	-	10	50	-
		-	-	10	60	NS
		-	-	10	80	-
		-	-	10	100	NS
		-	-	20	20	S
		-	-	20	50	-
		-	-	20	60	NS
		-	-	20	80	-
		-	-	20	100	NS
		-	-	25	20	S
		-	-	25	50	-
		-	-	25	60	NS
		-	-	25	80	-
		-	-	25	100	NS
		-	-	30	20	S
		-	-	30	50	-
		-	-	30	60	NS
		-	-	30	80	-
		-	-	30	100	NS
		-	-	30	120	-
		-	-	35	20	-
		-	-	35	50	-
		-	-	35	60	NS
		-	-	35	80	-
		-	-	35	100	NS
		-	-	40	20	-
		-	-	40	50	-
		-	-	40	60	-
		-	-	40	80	-
		-	-	40	120	-
		-	-	t	20	-
		-	-	up to 45	50	-
		-	-	up to 45	60	-
		-	-	up to 45	80	-
		-	-	50	20	L
		-	-	50	50	-
		-	-	50	60	NS
		-	-	50	80	-
		-	-	50	100	NS
		-	-	>50	20	NS
		-	-	>50	50	-
		-	-	>50	60	NS
		-	-	>50	100	NS
		-	-	65	120	-
		-	-	85	20	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
266	**NITROBENZENE**	6	210	tg-1	20	S
		-	-	tg-1	50	-
		-	-	tg-1	60	L
272	OXALIC ACID **(SUBL.)**	102	-	Dil Sol.	20	-
		-	-	Dil Sol.	60	-
		-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	L
		-	-	Sat Sol.	10	NS
		-	-	50	100	-
273	OXYGEN, **GAS**	-	-	tg-g	20	S
		-	-	tg-g	50	-
		-	-	tg-g	60	-
		-	-	tg-g	100	-
283	PETROLEUM ETHER **(LIGROIN)**	-	-	Work Sol.	20	L
		-	-	Work Sol.	60	L
		-	-	Work Sol.	100	-
284	**PHENOL**	41	182	Sol.	20	-
		-	-	Sol.	60	-
		-	-	Sol.	80	-
		-	-	5	20	S
		-	-	5	60	S
		-	-	5	120	-
		-	-	50	80	-
		-	-	90	20	S
		-	-	90	40	-
		-	-	90	60	-
		41	182	tg-s	20	-
		-	-	tg-s	50	-
		-	-	tg-s	60	-
287	**PHOSPHINE**	-134	-88	tg-g	20	S
		-	-	tg-g	40	-
		-	-	tg-g	60	S
288	PHOSPHORIC **ACID**	42	-	Up to 50	20	S
		-	-	Up to 50	50	-
		-	-	Up to 50	60	S
		-	-	Up to 50	80	-
		-	-	Up to 50	100	S
		-	-	50 to 75	20	S
		-	-	50 to 75	50	-
		-	-	50 to 75	60	S
		-	-	50 to 75	80	-
		-	-	50 to 75	100	-
		-	-	25 to 85	20	S
		-	-	25 to 85	50	-
		-	-	25 to 85	60	S
		-	-	25 to 85	80	-
		-	-	25 to 85	100	S
		-	-	98	100	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
328	PROPANE, **GAS**	-190	-45	tg-g	20	S
		-	-	tg-g	120	-
329	PROPIONIC **ACID**	-20	141	50	20	-
		-	-	50	60	-
		-	-	>50	20	S
		-	-	tg-1	20	-
		-	-	tg-1	60	-
335	SILICONE **OIL**	-	-	tg-1	20	S
		-	-	tg-1	50	S
		-	-	tg-1	60	S
340	SODIUM **ACETATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
		-	-	tg-s	80	-
341	SODIUM ACID **SULPHATE (SEE346)**					
342	SODIUM **ANTIMONATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
343	SODIUM **ARSENITE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
344	SODIUM **BENZOATE**	-	-	Sat Sol.	20	-
		-	-	Sat Sol.	40	-
		-	-	Sat Sol.	60	-
		-	-	35	20	S
		-	-	35	60	L
		-	-	50	100	-
345	SODIUM **BICARBONATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	S
346	SODIUM **BISULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	40	-
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	50	100	-
347	SODIUM **BROMIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	40	-
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	50	120	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
348	SODIUM **CARBONATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
		-	-	25	20	S
		-	-	25	50	-
		-	-	25	60	S
		-	-	25	80	-
		-	-	25	100	-
		-	-	Up to 50	20	S
		-	-	Up to 50	50	-
		-	-	Up to 50	60	S
		-	-	Up to 50	80	-
		-	-	Up to 50	100	L
349	SODIUM **CHLORATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
350	SODIUM **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	80	-
		-	-	Sat Sol.	100	-
		-	-	10	20	S
		-	-	10	50	-
		-	-	10	60	S
		-	-	10	80	-
		-	-	10	100	S
351	SODIUM **CHLORITE**	-	-	Dil Sol.	80	-
		-	-	2	20	S
		-	-	2	60	L
		-	-	2	100	NS
		-	-	20	20	S
		-	-	20	40	-
		-	-	20	60	L
		-	-	20	100	NS
352	SODIUM **CHROMATE**	-	-	Dil Sol.	20	S
		-	-	Dil Sol.	50	-
		-	-	Dil Sol.	60	S
		-	-	Dil Sol.	80	-
357	SODIUM **FLUORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
362	SODIUM **HYDROGEN SULPHITE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	60	-
		-	-	50	100	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
363	SODIUM **HYDROXIDE**	-	-	Sol.	20	S
		-	-	Sol.	50	-
		-	-	Sol.	60	S
		-	-	Sol.	80	-
		-	-	Sat Sol.	20	-
		-	-	Sat Sol.	60	-
		-	-	1	20	S
		-	-	1	50	-
		-	-	1	60	S
		-	-	1	100	S
		-	-	5	20	-
		-	-	10 to 35	20	S
		-	-	10 to 35	50	-
		-	-	10 to 35	60	-
		-	-	10 to 35	80	-
		-	-	30	80	-
		-	-	40	20	S
		-	-	40	50	-
		-	-	40	60	-
		-	-	40	80	-
		-	-	10 to 60	20	S
		-	-	10 to 60	50	-
		-	-	10 to 60	60	S
		-	-	10 to 60	100	S
364	SODIUM **HYPOCHLORITE**	-	-	2	100	-
		-	-	5	20	S
		-	-	5	50	-
		-	-	5	60	S
		-	-	10 to 15	20	S
		-	-	10 to 15	50	-
		-	-	10 to 15	60	-
366	SODIUM **NITRATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
367	SODIUM **NITRITE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
371	SODIUM **PHOSPHATE, ACID**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
372	SODIUM **PHOSPHATE, NEUTRAL**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
328	PROPANE, **GAS**	-	-	Sol.	20	S
		-	-	Sol.	50	-
		-	-	Sol.	60	S
		-	-	Sat Sol.	20	-
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	-
		-	-	50	100	-
374	PROPANE, **GAS**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
		-	-	0,1	20	S
		-	-	0,1	50	-
		-	-	0,1	60	S
375	SODIUM **SULPHIDE**	-	-	Sat Sol.	20	-
		-	-	Sat Sol.	60	-
376	SODIUM **SULPHITE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
		-	-	40	20	S
		-	-	40	60	S
		-	-	40	100	S
380	SULPHAR DIOXIDE, **DRY GAS**	-73	-10	-	20	S
		-	-	-	60	-
381	SULPHAR DIOXIDE, **WET GAS**	-73	-10	-	20	S
		-	-	-	40	-
		-	-	-	60	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
383	SULPHURIC **ACID**	-	-	up to 10	20	S
		-	-	up to 10	50	-
		-	-	up to 10	60	S
		-	-	up to 10	80	-
		-	-	up to 10	100	S
		-	-	15	20	S
		-	-	15	50	-
		-	-	15	60	-
		-	-	15	80	-
		-	-	15	100	-
		-	-	10 to 30	20	S
		-	-	10 to 30	60	S
		-	-	10 to 30	80	-
		-	-	10 to 50	20	S
		-	-	10 to 50	60	-
		-	-	10 to 50	80	-
		-	-	10 to 50	120	-
		-	-	50	20	S
		-	-	50	50	-
		-	-	50	60	L
		-	-	50	80	-
		-	-	50	100	L
		-	-	60	120	-
		-	-	50 to 75	20	-
		-	-	50 to 75	60	-
		-	-	50 to 75	80	-
		-	-	80	120	-
		-	-	50 to 90	20	-
		-	-	50 to 90	60	-
		-	-	50 to 90	80	-
		-	-	90	100	-
		-	-	75 to 90	20	-
		-	-	75 to 90	50	-
		-	-	75 to 90	60	-
		-	-	75 to 90	80	-
		-	-	95	20	-
		-	-	95	50	-
		-	-	95	60	-
		-	-	95	80	-
		-	-	95	100	-
		-	-	96	20	S
		-	-	96	50	-
		-	-	96	60	L
		-	-	96	80	-
		-	-	96	100	NS
		-	-	98	20	L
		-	-	98	40	-
		-	-	98	50	-
		-	-	98	60	NS
		-	-	98	80	-
		-	-	98	100	NS
		-	-	fuming	20	L
		-	-	fuming	50	-
		-	-	fuming	60	NS
		-	-	fuming	100	NS

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
393	**TOLUENE**	-95	111	tg-1	20	L
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
394	TRICHLOROACETIC **ACID**	58	197	Up to 50	20	S
		-	-	Up to 50	40	-
		-	-	Up to 50	60	S
		-	-	tg-s	40	-
396	**TRICHLOROETHYLENE**	-85	87	tg-1	20	NS
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	80	-
		-	-	tg-1	100	NS
401	**TURPENTINE**	-	-	tg-1	20	NS
		-	-	tg-1	50	-
		-	-	tg-1	60	NS
		-	-	tg-1	100	NS
402	**UREA**	133	-	Sol.	20	-
		-	-	Sol.	50	-
		-	-	Sol.	60	-
		-	-	Sol.	80	-
		-	-	Sol.	100	-
		-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	-
		-	-	Sat Sol.	80	-
		133	-	10	20	-
		-	-	10	50	-
		-	-	10	60	-
		-	-	10	80	-
		-	-	10	100	-
404	**URINE**	-	-	10	20	S
		-	-	10	50	-
		-	-	10	60	S
406	**VINEGAR**	-	-	Work Sol.	20	S
		-	-	Work Sol.	60	S
408	**WATER**	-	-	-	20	S
		-	-	-	50	-
		-	-	-	60	S
		-	-	-	80	-
		-	-	-	100	s
		-	-	-	120	-
414	**WATER, SEA**	-	-	-	20	S
		-	-	-	50	-
		-	-	-	60	S
		-	-	-	80	-
		-	-	-	100	S
		-	-	-	120	-

No.	Chemical	m.p. °c	b.p. °c	Concentration %	T °c	Resistance
420	ZINC **CARBONATE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	-
421	ZINC **CHLORIDE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
		-	-	58	20	S
		-	-	58	50	-
		-	-	58	60	S
422	ZINC **CHROMATE**	-	-	Sat Sol.	20	-
		-	-	Sat Sol.	60	-
423	ZINC **CYANIDE**	-	-	Sat Sol.	20	-
		-	-	Sat Sol.	60	-
424	ZINC **NITRATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-
425	ZINC **OXIDE**	-	-	Susp.	20	S
		-	-	Susp.	50	-
		-	-	Susp.	60	S
		-	-	Susp.	100	-
426	ZINC **STEARATE**	125	-	Susp.	20	-
		-	-	Susp.	50	-
		-	-	tg-s	100	-
427	ZINC **SULPHATE**	-	-	Sat Sol.	20	S
		-	-	Sat Sol.	50	-
		-	-	Sat Sol.	60	S
		-	-	Sat Sol.	100	-

9

PRODUCT RANGE

- Pipes with Socket **(available in two lengths: 1 Mtr. and 3 Mtr.)**
- **(Any length requested by client).**
- All dimensions in **mm.**

01
PIPES WITH **SOCKET**

DIAMETER (MM)	THICKNESS S (MM)
32	1.8
50	1.8
63	1.8 / 2.0 / 2.5
75	1.9 / 2.9
110	2.7 / 4.1
160	3.9 / 5.5

02
ELBOW **87.5°**

OD	D	H	D1	H1	S
32	34	37.02	32.1	44.64	1.8
50	52	44.5	50.1	54.5	2.5
63	65	49.5	63.15	56.9	2.5
75	77.3	50	75.2	59	2.5
110	112.3	60.7	110.2	70	3.5
160	162.5	73.5	160.2	80.25	5.3

04
ELBOW 87.5^{0} **WITH DOOR**

OD	D	H	D1	H1	S
75	77.3	50	75.1	70	2.5
110	112.3	60.7	110.2	75.6	3.5
160	162.5	73.5	160.2	80.25	5.3

03
ELBOW **45°**

OD	D	H	D1	H1	S
32	34	37.02	32.1	51	1.8
50	52	44.5	50.1	65.4	2.5
63	65	49.2	63.15	70	2.5
75	77.3	50.51	75.1	70	2.5
110	112.3	60.6	110.1	75.6	3.5
160	162.5	73.5	160.2	82.08	5

05
TEE **87.5°**

OD	D	H	D1	H1	S	L
32	34	37	32.1	44.9	1.8	120.5
50	52	44.5	50.1	52.43	2.5	158
63	65	49.2	63.15	54.5	2.5	180.3
75	77.3	50.51	75.1	59	2.5	194
110	112.3	60.6	110.1	69	3.5	252.5
160	162.5	73.5	160.2	73	5	334

06
TEE **REDUCER 87.5°**

OD	D	H	D1	H1	S	D	H	L
75/50	77.3	50	75.1	59	2.5	52	44	194
75/63	77.3	50	75.1	69	2.5	65	49	194
110/63	112.3	60	110.1	70	3.5	65	49.9	252.5
110/75	112.3	60.6	110.1	80	3.5	77.3	90	252.5
160/110	162.5	72.6	160.2	87.6	5	112.3	92.9	300

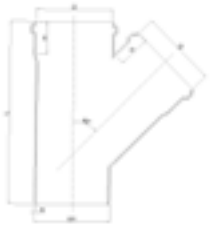
07
TEE **WITH DOOR 87.5**

OD	D	H	D1	H1	S	L
75	77.3	50.51	75.1	59	59	194
110	112.3	60.76	110.2	70.25	70.25	252.5
160	162.5	73.5	160.2	73	73	334

08
REDUCED TEE
87.5° WITH DOOR

OD	D	H	D1	H1	S	D	H	L
75/50	77.3	50	75.1	56	2.5	52	44	194
75/63	77.3	50	75.1	59	2.5	65	48.8	194
110/63	112.3	60	110.1	69	3.5	65	49.8	252.5
110/75	112.3	60.6	110.1	69	3.5	77.3	60	252.5
160/110	162.5	72.5	160.2	90	5	112.3	70.9	300

09
TEE **45°**

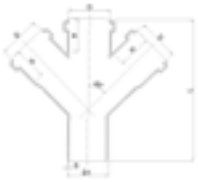


OD	D	H	D1	H1	S	L
32	34	37.02	32.1	44	1.8	130.5
50	52	44.5	50.1	54.5	2.5	175
63	65	49.2	63.15	59	2.5	200.3
75	77.3	50.51	75.1	69	2.5	220
110	112.3	60.6	110.1	70	3.5	293
160	162.5	73.5	160.2	82	5	394

10
REDUCED **TEE 45°**

OD	D	H	D1	H1	S	D	H	L
75/50	77.3	50	75.1	59	2.5	52	44	187
75/63	77.3	50	75.1	59	2.5	52	44	205
110/50	111.9	60	110.1	69	3.5	65	48.8	208
110/63	112.3	60	110.1	69	3.5	65	48.5	225
110/75	112.3	65.75	110.1	69.5	3.5	75.6	59.21	290
160/110	162.5	72.5	160.2	85	5	112.3	60	325

11
T- CROSS **45°**



OD	D	H	D1	H1	S	L
75	77.3	50	75.1	59	2.5	220
110	112.3	60	110.1	69	3.5	293

12
REDUCER

OD	D	H	D1	H1	S	L
50/32	34.49	43.8	50.1	52.8	2	113.8
63/50	52	44.5	63.15	56	2.5	116
75/50	52	44.5	75.1	60	2.5	125
110/50	52	48.5	75.2	60	2.5	128
75/63	65	49.2	110.1	70	3.5	152
110/63	65	50	110.1	70	3.5	152
110/75	77.3	51.9	110.1	70	3.5	152
160/110	112.3	60.6	160.2	83.8	5	185

13
DOUBLE **SOCKET**

OD	D	H	S	L
32	34	44	1.8	90
50	52	48.5	2.5	100
63	65	51	2.5	105
75	77.3	53	2.5	110
110	112.3	60.5	3.5	125
160	162.5	75	5	155

14
SOCKET **WITH THREAD 1.5**

OD	D1	H1	S	L
1.5"	50	81.75	2.2	96.5

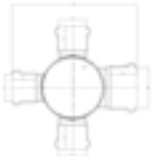
15
CLEAN OUT

OD	D1	H1	S	L
75	75.2	60.9	2.5	87.15
110	110.15	68.2	3.5	98.11
160	160.3	69.2	5.5	114

16
END CAP

OD	D1	H	S	L
32	32	30.5	1.8	33
50	50	33	2.2	36
63	63	33.5	2.5	36
75	75	40	2.5	43
110	110	42	3	44
160	160	65	5.2	170

17 FLOOR **DRAIN**



OD	D	H	D	H	S	D1	L
110/75/50	77.3	50	52	48	2.5	110	220.3
110/75/63	77.3	50	65	48	2.5	110.25	220.3

18 **SIPHON** (P-TRAP)

OD	D	H	D1	H1	S	L
110	117	67.37	110.1	94	3.5	201.9

19 **VENT**

OD	D2	H2	S	L
75	75.45	46.9	2.5	92.2
110	110.45	54.5	3.5	102.1

10

INSTALLATION INSTRUCTIONS

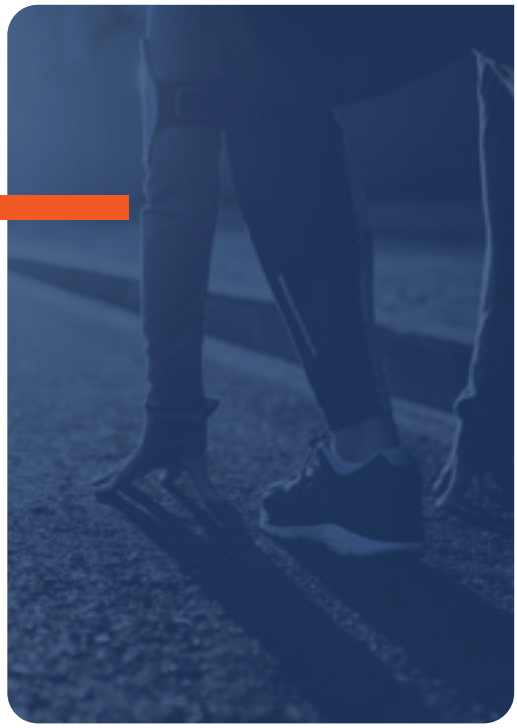
PIPE AND FITTING
PREPARATION AND JOINTING.

1. Cutting the pipes to length

The pipes can be cut to length with a commercial pipe cutter or with a fine-toothed saw. The cuts are to be made at an angle of 90° to the pipe shaft.

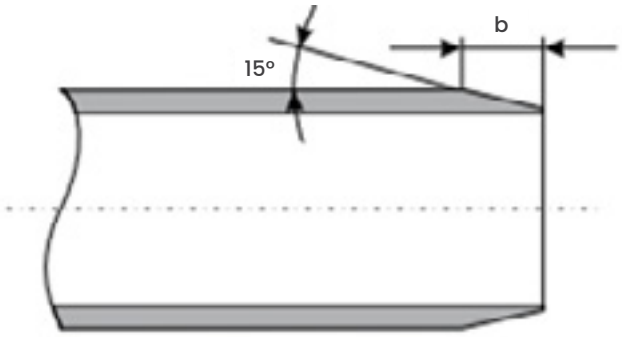
Remove any trimmings or bumps at the disconnecting point.

The cutting edges are to be smoothened on the inside and on the outside.



2. Beveling the pipes

The pipe end is then beveled with a beveling tool or by using a coarse file at an angle of approx. 15° as shown in the following figure



3. Connecting Pipes and Fittings

- Clean the pipe spigot end and clean the socket.
- Check the condition, quality and place of the factory pre-installed sealing element (Rubber Gasket).
- Apply suitable lubricant lightly and evenly on the beveled surface only of the spigot end.
- When inserting, the ring seal must be free of lubricant, center up the spigot end of the pipe and push until the pipe end reaches the end of the socket.

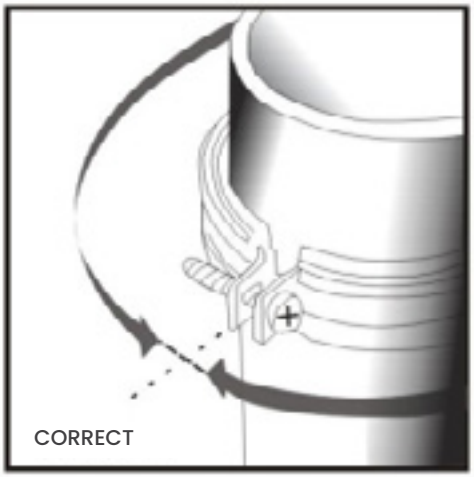
4. Pipe Clamps

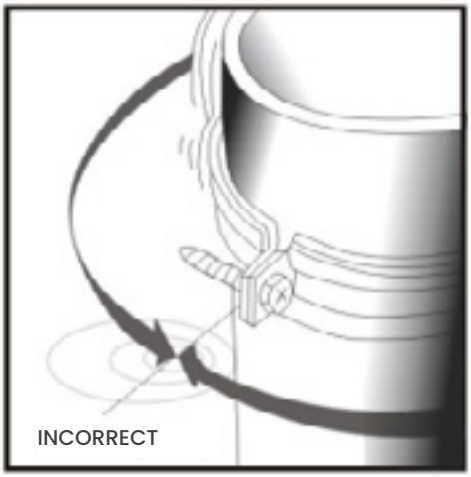
- The Clamp must be slightly bigger than the outside diameter of the pipe when installed.
- The distance between pipe clamps must be as the following figure.

Recommended pipe clamp intervals

DIAMETER (MM)	HORIZONTAL (METER)	VERTICAL (METER)
50mm	0.50	1.50
75mm	0.80	2.00
110mm	1.10	2.00
160mm	1.60	2.00

5. Fastening with clamps

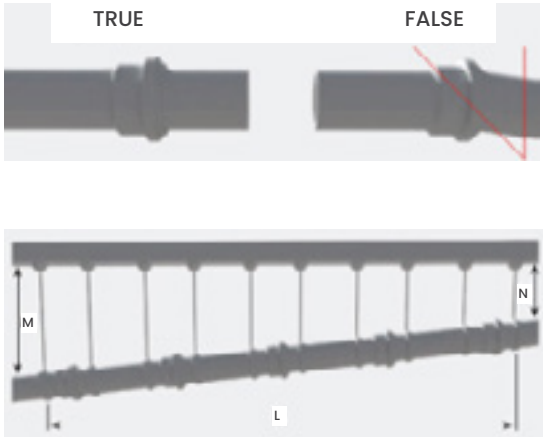




PIPE LINE
INSTALLATION INSTRUCTIONS.

1- All Roxy systems are designed to drain wastes in atmospheric pressure only with temperature up to 95°c.

2-The horizontal lines shall be inclined as shown:



M: The larger height from the pipe surface to the reference horizontal plane.

N: The smaller height from the pipe surface to the reference horizontal plane.

L: The horizontal distance between the first and last clamps.

3-The two parts should be well aligned.

4-Roxy Fittings should always be laid out as fixed points, e.g. installing two clamps right before and after the socket.

5-The clamp should be installed carefully near the socket area to prevent ovality in the socket, which may affect sealing quality.

6-The distance between the clamps for horizontal and vertical installations should not be greater than the values in the next table.

DN	HORIZONTAL DISTANCE (cm)	VERTICAL DISTANCE (cm)
32	50	120
40	50	120
50	50	150
75	80	200
90	90	200
110	110	200
160	160	200
200	200	200

7-When installing heavy duty lines like the horizontal headers that receive high flow rates from one or more water columns, a steel structure member such as beams and angles must be used to hold the pipes, in order to maintain alignment and withstand these heavy loads.

8-Additionally, it is recommended to use a pipe between every two fittings to hold structure members or clamps, in order to eliminate slipping or misalignment due to the heavy loads.

9-When Roxy pipes are laid in concrete the socket gaps should be sealed with an adhesive tape in order to prevent penetration of the cement grout.

11

PACKAGING, TRANSPORTATION AND STORAGE

1- PACKAGING

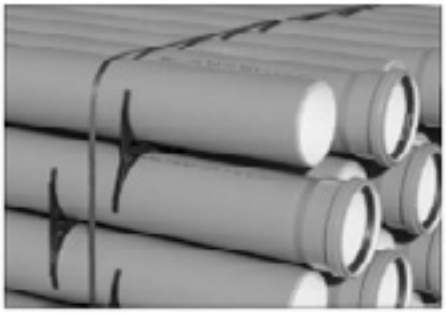
Immediately after the production pipes are placed and packed in original factory packaging, and pallets of standardized quantity and size. For this purpose, floor bars are used to lay pipes on, in order to prevent pipe contact with inadequate surface.

Depending on the diameter and length of pipe two or three bars are used to ensure the stability of the connection and the ability to manipulate with forklift.

Pipes inside the bundles are reinforced with pipe brushes.

Entire bundle is secured with plastic strip that gives additional strength to the package.

Legend:
w= width of bundle h=height of bundle L=length of bundle a=number of pipes by width b= number of pipes by height



2- TRANSPORTATION

When loading and unloading of bundles it is necessary to pay attention to the pipe ends in order to avoid the deformation / breakage of the pipe sleeve, damage of the seal or flat end of the pipe.

Placing heavy objects over the pipes can cause ovality of pipes which will disappear on its own when the load is decreased.

For better utilization of transport bundles can be stacked in height to full height of loading space (max. 3m) without risk of damage.

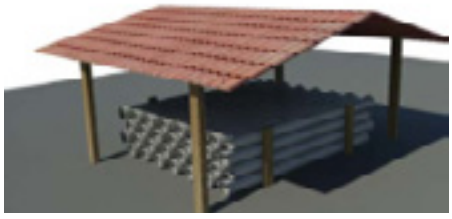
During transport it is recommended to stack pipes up to four bundles in height, for diameters from Ø 50 to Ø 75 or up to two bundles in height for diameters from Ø 110 to Ø 160.

3- STORAGE

It is recommended to use indoor warehouse or covered space in order to protect pipes from the effects of weathering.

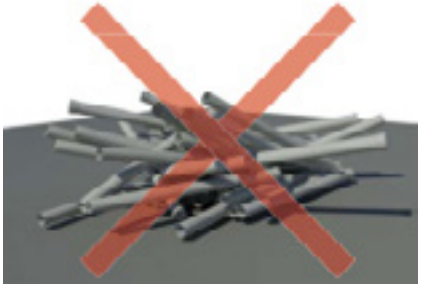
It is not recommended to expose pipes (and seals) to sunlight for more than 6 months in order to avoid change of the material properties.

In conditions of low ambient temperature (0 °C or lower) all polymeric materials become brittle and less elastic so it is necessary to pay attention to protect pipes from dropping from a height.



If the pipes are on stock, they can be stacked up to four bundles in height,

for diameters from Ø 50 to Ø 75 or up to two bundles in height for diameters from Ø 110 to Ø 160.



12

QUALITY CONTROL AND ASSURANCE

It is our mission at **ROXYPLAST** to maintain the highest level of quality through clear operating procedures, work instructions as well as forms and records.

Statistical quality control and sound documentation ensure that traceability is maintained at any time in the future.

ROXYPLAST always maintains the highest standards of quality for its users. This is why it warrants up to 50 years guarantee for all its piping network components starting from the date of purchase.

ROXYPLAST maintains a comprehensive quality control system. From designing the required specifications and controlling the incoming raw materials, processing, packing, storing and shipping the product to the customer, to the after-sale service.

The overall quality system operation and documented by **ROXYPLAST** is implemented Throughout the plant. It has been designed to exceed requirements stated by national and international authorities and institutions. Regular checks are done to further eliminate any chance of quality deviation.

Below you will find some of the tests done in our plants laboratory to ensure high **ROXYPLAST** quality:

- **Hydrostatic pressure.**
- **MFR.**
- **Density measurement.**
- **Oxidation induction time determination.**
- **Moisture Content measurement.**
- **Heat Reversion.**
- **Color assessment.**

13

CERTIFICATES

Date of issue: 21 August 2024
This report enfolds 10 pages.

tgm
Staatliche Versuchsanstalt
Kunststoff- und Umwelttechnik

FEDERAL INSTITUTE OF TECHNOLOGY
PLASTICS TECHNOLOGY AND
ENVIRONMENTAL ENGINEERING

Inspection report

TGM – VA KU 31 609

Plastics piping system made of PP for sewerage – application area B

Type test according ÖNORM EN 1451 (2018-07

Commissioned by:	Roxy for Metal and Plastic Products
Address:	EG-11341 HELIOPOLIS , 29 MOURAD BEK ST, Egypt
Order reached:	09.08.2024
Sign of order:	Atef Bedawe
Receiving of test sample(s):	19.06.2024 A3902
Testing periode:	Cw 20 /2024 to cw 34/2024
TGM-number:	208/24

tgm | Technologisches Gewerbemuseum | Höhere Technische Bundes-Lehr- und Versuchsanstalt
Austria | 1200 Vienna | Wexstraße 19-23 | t: +43 1 331 26-478
vaku@tgm.ac.at | www.va-tgm.com

CERTIFICATE

No.: N 002172

The Austrian Standards plus GmbH (an accredited certification body in accordance with ISO/IEC 17065) issues this certificate.

Holder of certificate:	Roxy - For Metal & Plastic Products 29 Mourad Bek St., Ismaelia Sq.,Heliopolis, 11341 Cairo, Egypt
Production site:	Factory P1 Industrial Zone B,C-plot 3-Block 270011 Obour City, Egypt
Standard(s):	ÖNORM EN 1451-1:2018-07-15 *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polypropylene (PP) - Part 1: Specifications for pipes, fittings and the system* This certificate attests the conformity of the product listed above with the requirements of the standard referenced.
Product:	Pipes made of polypropylene block copolymer (PP-B) Pipes with plug-in socket, colour: grey, application code B, pipe series S 20, marking "ice crystal", dimension group 1 and 2
Mark of conformity:	This certificate entitles the holder of the certificate to use the following conformity mark:
Date of issue:	2024-10-14
Date of initial issue:	2024-10-14

Dr. Peter Jonas
Director Certification

AUSTRIAN STANDARDS

CERTIFICATE

No.: N 002173

The Austrian Standards plus GmbH (an accredited certification body in accordance with ISO/IEC 17065) issues this certificate.

Holder of certificate: Roxy - For Metal & Plastic Products

29 Mourad Bek St., Ismaelia Sq.,Heliopolis, 11341 Cairo, Egypt

Production site: Factory P2 Industrial Zone 1 West - plot 4 - Block 20036 Obour City, Egypt

Standard(s): ÖNORM EN 1451-1:2018-07-15 *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polypropylene (PP) - Part 1: Specifications for pipes, fittings and the system*

This certificate attests the conformity of the product listed above with the requirements of the standard referenced.

Product: Fittings made of polypropylene block copolymer (PP-B)
Injection-molded fittings (SF) with plug-in socket, color: grey, application code B, pipe series S 20, marking "ice crystal", fitting groups: bend, branch, other fittings, dimension group 1 and 2

Mark of conformity: This certificate entitles the holder of the certificate to use the following conformity mark:

Date of issue: 2024-10-14

Date of initial issue: 2024-10-14

Docusigned by:

Dr. Peter Jonas
Director Certification

Austrian Standards plus GmbH, Heinestrasse 38, A-1020 Wien, www.austrian-standards.at
Austrian Standards plus GmbH is a 100% subsidary of Austrian Standards International.

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Total Quality. Assured.

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Roxy for metal and plastic products

Main Site: Obour City – Industrial Zone B,C- Plot 3 - Block 270011 - Egypt

See appendix for additional sites and additional site scopes

has been registered by Intertek as conforming to the requirements of:

ISO 14001:2015

The management system is applicable to:

Producing of U-PVC ,PP, PE and PP-R pipes , fitting and accessories

Certificate Number:
0117608

Initial Certification Date:
13 September 2021

Last Certificate Expiry Date:
12 September 2024

Date of Last Recertification Audit:
25 August 2024

Certification Cycle Start Date:
08 October 2024

Issuing Date:
08 October 2024

Valid Until:
12 September 2027

Calin Moldovean
President, Business Assurance

Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

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CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Roxy for metal and plastic products

Main Site: Obour City – Industrial Zone B,C- Plot 3 - Block 270011 - Egypt

See appendix for additional sites and additional site scopes

has been registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The management system is applicable to:

Producing of U-PVC ,PP, PE and PP-R pipes , fitting and accessories

Certificate Number:
0117610

Initial Certification Date:
13 September 2021

Last Certificate Expiry Date:
12 September 2024

Date of Last Recertification Audit:
25 August 2024

Certification Cycle Start Date:
08 October 2024

Issuing Date:
08 October 2024

Valid Until:
12 September 2027

intertek

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Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Roxy for metal and plastic products

Main Site: Obour City – Industrial Zone B,C- Plot 3 - Block 270011 - Egypt

See appendix for additional sites and additional site scopes

has been registered by Intertek as conforming to the requirements of:

ISO 45001:2018

The management system is applicable to:

Producing of U-PVC ,PP, PE and PP-R pipes , fitting and accessories

Certificate Number:
0117609

Initial Certification Date:
13 September 2021

Last Certificate Expiry Date:
12 September 2024

Date of Last Recertification Audit:
25 August 2024

Certification Cycle Start Date:
08 October 2024

Issuing Date:
08 October 2024

Valid Until:
12 September 2027

Calin Moldovean
President, Business Assurance

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Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

NOTES

A MEMBER OF ROXY FOR METAL AND PLASTIC PRODUCTS

PP MAIN FEATURES

FLEXIBLE | **UV** Resistant | **CHEMICAL** Resistance | Low **NOISE** | **LONG** Life | **RUBBER** Gasket

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FACTORY 3: 10th of Ramadan City, Industrial Zone, El Sharkia - Egypt
CENTRAL STORES: EL Obour City, Industrial Zone, Cairo - Egypt

Customer Service : 0100 5800 220 - **HOT LINE :** 15579

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